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RESEARCH ARTICLE

Measuring the sustainability of Cuban tourism destinations considering stakeholders' perceptions

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Abstract

The aim of this research consists of measuring the sustainability degree for tourism destinations considering the stakeholder's preferences. Their opinions were included in the overall process during the choice of the initial indicators and determining the weights. Additionally, in the aggregation process, a sustainability index was calculated with a multiple criteria decision theory methodology, according to its ability to embrace the participant opinions in the decision-making process. Results allows determining the sustainability degree and the identification of strengths and weaknesses in terms of goals attainment. To corroborate the robustness of the index, an analysis of the rankings was performed.

KEYWORDS

indicators, stakeholders` perceptions, sustainability index, sustainable tourism

1 | INTRODUCTION

In the measurement of tourist sustainability, the use of indicators has become an important issue (Penny & Li, 2013). They are recognized as a useful tool for policy making and public communication in conveying information of countries and corporate performance in different fields (Singh et al., 2009).

Indicators must be sensitive to the perceptions of those involved in tourism development, in search for a set of indicators that make the results easy to interpret and, in turn, includes their concerns. Several studies have been developed with the aim to combine stakeholder's considerations with tourist destinations behavior, for example, the works of López-Gamero, et al. (2011), Penny and Li (2013), Chuang (2013), Hooi et al. (2014), Lupoli and Morse (2015), and Burrai et al. (2015), among others. Therefore, the main objective of this paper is to measure the sustainability degree of Cuban tourist destinations, taking into account the stakeholder's perceptions, considering that their inclusion in tourism planning, decision-making, and destination management is an essential element of change management (Nogueira & Pinho, 2015).

To achieve this goal, we propose the construction of a sustainability index through the combination of representative indicators in each sustainability dimension (Nardo, et al., 2005), creating a "synthetic index". Its construction owes more to the craftsmanship of modeler than to universally accepted scientific rules for encoding (OECD, 2008) and should have the capacity to include in their conception the aspirations of those involved in the analyzed concept.

According to Freeman (1984), stakeholders, in an organizational and management context, are any groups or individuals who can affect or are affected by the achievement of organizational goals. In this study, the inclusion of stakeholder's perceptions is going to be achieve during the selection of the initial indicators by means of a participative process to include those aspects considered relevant to measure the sustainability in the host destinations. Stakeholder's considerations will be also incorporated in the attainment of weights, using the Delphi method.

The construction of a synthetic indicator involves, also, the choice of the aggregation procedure. Thus, due to the necessity to include the stakeholder's perceptions in the index, we opt for the proposal of Blancas et al. (2010), included within the Multicriteria Decision Theory. In this sense, the process includes, from the beginning, the needs of those involved in the decision-making process through the establishment of goals, representative of the desired levels of sustainability for each aspect represented by the indicators.

2 | LITERATURE REVIEW

2.1 | Tourism sustainability

Sustainable development relates to aspects of economic–social–cultural–environmental protection and development. There are many definitions of sustainable development as it can mean different things to different people (Hai et al., 2014). In recent years, the concept of sustainability has received an immense amount of attention in the socio-economic and managerial literature. This concept forms a nexus between the development of society and the economic representatives that operate within it, and is bounded by the environmental, socio-cultural and economic framework (Sancho et al., 2007), making it a complex and uneasy concept.

An attempt to measure sustainability has to face some conceptual challenges: (a) the concept is not univocally defined, and efforts to measure it are difficult to implement (Bell & Morse, 2001); (b) sustainability is not a universal concept; it may be influenced by local environmental, social, and economic contexts that may require more attention to be paid to specific aspects over others (Twining-Ward & Butler, 2002); (c) legal compliance is not enough to define a sustainable model of development and, in many cases, is difficult to achieve (Castellani & Sala, 2009).

From the tourism point of view, sustainability involves the relationship among tourist, host destination, local resources, tour operators, etc. As well as sustainable development, tourism literature offers a multitude of definitions for sustainable tourism (Wan & Li, 2004), for example, the works of Choi and Sirakaya (2006), Díaz and Norman (2006), Krajnc and Glavic (2005), World Tourism Organization (2004), among others, and the discussion about its dimensions remains active (Pérez et al., 2013). We used the dimensions defined by Díaz and Norman (2006) economic, social and patrimonial, the latter being understood as all matters concerning natural and cultural environment.

A single quantitative measure of sustainability in tourism remains elusive because of difficulties in definition, what to include, accounting, comparing different impacts in commensurate terms (Buckley, 2009), and its multicriterial character due to the wide range of aspects this concept involves.

In the Cuban context, tourism sustainability is managed by the Cuban Ministry of Science, Technology and Environment, by means of the Law 81 of The Environment and the Environmental Impact Assessment to evaluate the sustainable use of resources in the development of projects and the improvement of the environmental protection. Also the Cuban Ministry of Tourism achieves tourism sustainability. For it, Tourism Development Politics implies, in first place, the development of Cuban tourism regarding the sustainability and environmental protection of tourism destinations.

Hence, an inventory of the environmental wealth of tourism destination was made by an interdisciplinary team composed of specialists from the Development Department of the Cuban Ministry of Tourism, the Cuban Ministry of Science, Technology and the Environment, the Institute of Planning, and the Ministry of Agriculture where 64 sites were identified covering 20,100 km^2 (18% of the Cuban surface area), 62 of which are protected areas from different categories. Also, the inclusion of Cuba in the Caribbean Zone of Sustainable Tourism (CZST) is a local attempt to promote sustainable tourism practices in the area.

2.2 | Indicators

Sustainability measurement involves the selection of specific indicators. Broadly speaking, indicators need to meet at least two criteria (Reed et al., 2006). First, they must accurately and objectively evaluate progress towards sustainable development objectives. Second, it must be possible for local users to apply them. This step is important because there is not a list of universally and unanimously accepted indicators. In that sense, those indicators that better represents the aspects considering its importance according to the stakeholders' necessities in each destination should be selected.

There are a lot of quantitative tools for identifying indicators and to determine which indicators account for most of the observed changes. While these tools help create objective indicators, Andrews and Carroll (2001) illustrates how the technical challenges posed makes them inaccessible to those without advanced academic training.

Indicators can also be determined by participative techniques or consulting stakeholders using different criteria to evaluate them with respect to their objectivity and easy use (Reed et al., 2006). They have to be scientifically robust and credible, have a target level, baseline, or threshold against which to measure them and social appeal and resonance (Rubio & Bochet, 1998). At the same time, they have to be verifiable and replicable, measure what is important to stakeholders, be easily accessible to decision makers, be diverse to meet the requirements of different users and be developed by the end-users (Freebairn & King, 2003). These criteria imply a direct involvement of the decision makers during the selection of the initial indicators.

As Blancas et al. (2010) pointed out, various studies have attempted to define indicators systems for sustainable tourism. Nevertheless, most of these systems have been designed to evaluate developing destinations or present a theoretical definition of the indicators, but do not fully quantify it (Innes & Booher, 2000; Bell & Morse, 1999; Bosh, 2002; Dhakal & Imura, 2003; Hezri, 2004).

Some others' researches go beyond, quantify the indicators, and also create a composite index to measure tourism sustainability, mainly on the basis of statistic information (Padilla & McElroy 2005; Castellani & Sala, 2009; Blancas et al., 2010). There are lots of ways to create composite indicators, for example, Nardo et al. (2005), OECD (2008), Bernini et al. (2013), and Salvati and Carlucci (2014), and it is demonstrated that no methodology is more suitable than any other (Nardo et al., 2005). In this sense, we propose a sustainability index built from the stakeholders' perceptions. The aggregation procedure implies the use of a multiple-criteria technique to promote their inclusion in the process.

3 | METHODOLOGY

The methodology presented in this paper was completely developed and implemented as follows:

1. The choice of initial indicators to measure tourism sustainability, which includes stakeholder's consultation.
2. Quantification. This step involves a survey applied to tourist and local population to achieve the values of indicators and also their statistical description.
3. Weighting and aggregation, which embraces the application of the Delphi method to attain the weights and the calculation of the global sustainability index.

The study was made during three years from 2008 to 2010, and the stakeholders for our study were all the persons included in the process as we describe below: the participants in the Workshop of Tourism Sustainability, those included in the Delphi method, and the questioned tourist and local population.

3.1 | The choice of initial indicators

To select the initial indicators, we made a consultation to the participants in the Workshop of Sustainable Tourism Indicators developed in Viñales, Pinar del Río, Cuba, offered to the main stakeholders involved in tourism development of this locality as a continuation of the General Workshops for the CZST establishment.

In this step, 28 stakeholders were consulted, within them were included political representatives of the territory, managers, and employees from hotels of Viñales and workers from the Cuban Ministry of Tourism at local and national levels, performers from agriculture, also workers from the Ministry of Science, Technology and Environment and researchers with experience in this topic.

The composition of this group contributes to achievement of desired goals in the indicators selection, because, as it is pointed in Reed et al. (2006), by working together, community members and researchers can develop locally relevant, objective, and easy-to-collect sustainability indicators capable of informing management decision-making. The managers and employees of territorial enterprises represented community members, and the expert information was given by the researchers included in the process.

Experts are not always stakeholders because they may not constantly influence in tourism development. In our study, the included researchers were considered stakeholders because their contribution with destination development throughout projects participation and their previous research have influences sustainable tourism development.

The consultation was elaborated considering the indicators proposed in different studies to measure tourism sustainability, for examlple, the works of Twining-Ward & Butler (2009), Farsari and Prastacos (2001), Choi and Sirakaya (2006), Díaz and Norman (2006), and Sancho et al. (2002). Each participant was given a list of indicators, which they rated on a scale ranging from 0 to 10, where 0 indicated that it was not necessary for the study and 10 indicated that it was essential to the study. Any other value between 0 and 10 could be chosen. Those indicators which were given a score higher than or equal to the mean of the scores were selected. In total, 17 indicators were selected (7 social, 5 economic, and 5 patrimonial).

Selected indicators were subjective and reflect the perceptions of those involved in tourism development. Their inclusion is essential because in several studies, the main importance is given to the objective indicators, those which are obtained from sources of statistical information, avoiding the role that subjective components and perceptions play in the satisfaction of the internal (local population) and external costumers (tourists; Pérez et al., 2013).

Once the series of subindicators was obtained, a second consultation was performed with the aim of guaranteeing the reliability of previous selected indicators. The initial result was presented to the participants, and they were asked to point out those indicators they considered not necessary to be included in the study. No other indicator was selected and the list did not change. It is presented in Table 1, informing, also, the dimension and the sign of each indicator. Positive indicators are those for which higher values represent a better sustainability situation, while smaller values are descriptive of good sustainability performance for negative indicators.

From the social point of view, selected indicators allow us to measure aspects related to the social benefits for the host community, the influence of tourists in the local life style and perceived safety. Economically speaking, the indicators evaluate the level of tourist satisfaction considering the quality-price of lodging and restaurants, the quality of tourist employees and destinations offer. The patrimonial dimension embraces issues concerning to destination cleanliness, the effect of tourism in natural spaces, their conservation, and the valuation of cultural and local identities.

In that case, we consider that the procedure guarantees the reliability of the database because of the heterogeneity of specialists included in the process and the representativeness of the majority of the stakeholders and the existence of several points of view and necessities inherent to the local tourist development.

3.2 | Quantification

The application of a survey for tourists and another for residents was necessary to obtain indicators' values, what constitutes their perceptions about aspects considered important in sustainable tourism development. The survey was carried out with the help of ECOTUR Travel Agency, which has offices in all Cuban provinces and is in charge of the nature-based tourism offer. and also with the support of the Universities in the territories. The sample included 1,747 tourists and 3,344 residents. The method called Paper Assisted Personal Interviewing (PAPI) was applied in both cases to analyze qualitative variables using a five point Likert scale. In the case of tourists, 1 means the worst perception of the item asked and 5 indicates a very good perception.

The investigation units were the international tourists lodged in the hotels of every destination and a systematic sampling with random start was used. For the population, 1 indicates completely disagree with the affirmation made and 5 means completely agree, and a two-stage sampling: by clusters and random was conducted. In the first

TABLE 1 Selected indicators

N°	Indicator	Dimension	Sign	Weight
IS_1	Perception of the local population regarding whether improved roads and transport infrastructure are results of tourism.	Social	+	0,503
IS_2	Perception of the local population regarding whether improved public services are results of tourism.	Social	+	0,458
IS_3	Perception of the local population regarding whether the tourists have an undesirable effect in the region life style.	Social	-	0,562
IS_4	Perception of the local population regarding with what the tourism contributes to keep the young population in the city.	Social	+	0,539
IS_5	Perception of the local population regarding whether the life quality increases due the tourism.	Social	+	0,762
IS_6	Evaluation of the tourists about the destination's security.	Social	+	0,971
IS_7	Evaluation of tourists about the quality of public services (lighting, transport, banks, etc).	Social	+	0,792
IE_8	Perception of the relation quality—price of lodging in destination (state or private).	Economic	+	0,803
IE_9	Perception of the relation quality—price of restaurants in the destination.	Economic	+	0,701
IE_{10}	Evaluation of the quality of tourism's employees (Lodging, gastronomy and tour guides).	Economic	+	0,775
IE_{11}	Evaluation of the tourists about the quality of access roads and events signalization.	Economic	+	0,803
IE_{12}	Quality of tourist offer in the destination.	Economic	+	0,759
IP_{13}	Tourists' evaluation about destination cleanliness.	Patrimonial	+	0,467
IP_{14}	Tourists' evaluation about the offer of activities involved with the natural resources of the destination.	Patrimonial	+	0,868
IP_{15}	Perception of local residents about the effects in the environment and impairments of natural spaces caused by tourists.	Patrimonial	–	0,634
IP_{16}	Perception of local population about whether the tourist stimulates local crafts and culture.	Patrimonial	+	0,632
IP_{17}	Tourists' evaluation about the conservation of cultural resources and heritage in the destination.	Patrimonial	+	0,784

stage, the clusters were defined selecting the locality where the hotels are placed; in the second stage, the houses within the selected conglomerate were chosen randomly, and the survey was applied to all people between 17 and 70 years old.

3.3 | Exploratory analysis of initial indicators

A descriptive analysis of data demonstrates that the highest mean perception corresponds to the economic dimension with a mean value of 3.25 and a range of 3.4, being the quality of tourism's employees (IE_{10}) the indicator with the high average score 3.83. It follows the patrimonial dimension with 2.54, an observed range of 6.16 and the best contribution was identified for the destination cleanliness (IP_{13}) with a value of 3.79. Finally, the social dimension presented a mean value of 2.34, the range was 6.55, and the highest mean score belongs to the perceived safety (IS_6), reaching a mean perception of 3.83.

It is observed that the most common perceptions reach values of 2 for economic and patrimonial dimension, both with 75 cases for each one and 1 for social dimension with 105 cases. The highest value, located exactly at 50% of observations corresponded to 3.44 for patrimonial dimension, followed by the economic with 3.36 and finally the social dimension with 2.87.

In terms of variability, the economic dimension was the most unwavering, with a variation coefficient of 0.2092, which can provide small differences within the indexes for each destination in this dimension. Its variability differs considerably from those obtained for social and patrimonial dimensions, whose variation coefficients are extremely high, with values of 0.7949 and 0.8346.

3.4 | Weighting and aggregation

The determination of the weights has a significant effect on the value of the synthetic indicator and, therefore, on the derived ordination of it. Thus, in the bibliography, it is possible to notice the existence of a high number of weighting techniques (OECD, 2008).

While some analysts prefer statistic procedures to determine weights, others choose those that depend on the experts' opinion, in such a way that better reflects the priorities of those involved in the decision making process, like the participative methods such as Analytic Hierarchy Process, Group Analysis and Budget Allocation Process.

To achieve a representative criteria from necessities of the stakeholders, the indicators' weights were achieved by means of the Delphi method. This has been utilized as a tool of issue management and research (Kent & Saffer, 2014).

3.5 | The Delphi technique

The main purpose of adopting a Delphi technique for decision-making is to provide a structured approach to collecting data in situations where the only available alternative may be an anecdotal or an entirely

subjective approach (Linstone & Turoff, 1975). It has been proven as an appropriate and useful technique used to construct, identify, select, and validate factors and indicators (Ngọc, 2005).

Unlike surveys, the Delphi method asks experts to participate in the research process, and its elaboration brings participants together to explore ideas and issues to a greater extent than other methods, often generating consensus among participants, as well as obtaining new information to guide future activities (Kent & Saffer, 2014).

In our research, the expert panel was composed by 26 stakeholders, following the observation of Somers et al. (1984) who suggested that limiting the size of panel members makes it easier to control the work generated, since there was a possibility that too much input might bury good data. Compared to some previous studies (Miller, 2001; Stein et al., 2003), the sample size for this study is relatively small. However, the Delphi study elicits qualitative opinions from panelists who have expertise (Choi & Sirakaya, 2006).

The expert panel included some of the participants in the Workshop of Sustainable Tourism Indicators and researchers with investigations in this field, to achieve the inclusion of expertise and experience in the weighting process as well as the stakeholder's perceptions. According to the explanation given above, they were also considered stakeholders. To guarantee the complete quality of the panel, we adopted the methodology based on its self-assessment procedure, in which each participant evaluates its own quality to be included in the process, like in previous research (Hernández et al., 2014).

A first questionnaire was sent, through e-mail, jointly the self-valuation questionnaire, and the experts were asked to give a weighting score between 0 and 10 to each indicator, where 0 indicates absence of weight and 10 the highest importance. We use the e-mail due to the benefits it offers for the network as a technological support solving issues such as time, dynamism, information, and participation.

The self-assessment procedure showed that 13 experts (50%) obtained a high competence coefficient, nine with a medium coefficient (35%) and the other two participants were eliminated, and their answers were not considered because of a low coefficient. As a result, our last sample includes 24 participants.

The analysis of the Delphi results was performed on the basis of the average dispersion level, due to the reduced number of values per indicator. The reduced number of valuations per indicator and the differences between their average values allows us to choose this statistic over other more traditional ones such as the interquartile range and the determinant coefficient. In this way, the typical deviation (σ) was obtained for each indicator as well as the average of these values: 2.71.

With the aim to get a higher consensus a second round was performed. This time, the questionnaire exposes the weights of indicators, represented for the average values of the weights given in the first round. Experts were asked about their agreement with these values as weights for the selected indicators and, in case of disagreement, they had to propose a new ponder value. The difference between the typical deviations of the first and second rounds reveals the variation in the consensus degree.

$$\textit{Variation of the consensus degree} = \sigma_1 - \sigma_2 \tag{1}$$

The second round was answered for 13 experts and an average typical deviation of 1.33 was obtained, representative of a variation of 1.38 in the consensus degree, showing the existence of a higher agreement. This value was considered as reliable within a possibility between 0 and 10 in the punctuations and the weights gained in the second round were accepted as the importance levels of the sub-indicators.

Weights are presented in Table 1, where it can be noted that, according to the average values for each dimension, the stakeholders attribute more importance to the economic dimension (0.7685), followed by the patrimonial (0.6775), and finally the social (0.6559); however, the higher and lower weights were attained to social indicators, IS_6 and IS_2. In general, a great importance level was given to all indicators (values higher than 0.45), and the 70% obtained an importance level over 0.6 in a range [0, 1].

3.6 | Goal Programming Synthetic Indicator (GPSI)

Related to aggregation process, aiming to include the perceptions of the stakeholders in the composite measure, we opt for the proposal of Blancas et al. (2010) called goal programming synthetic index (GPSI), based on Multiple Criteria Decision Theory, specifically in Goal programming. The Multiple Criteria Decision Theory and its methods promote the contribution of the participants in the decision-making process (Pohekar & Ramachandran, 2004; Supriyasilp et al., 2009).

Considering a set of m initial indicators (I_j with $j = 1, 2,..., m$), for n units (U_i,with $i = 1, 2,..., n$) where X_{ij} represents the value of the ith unit valued in the jth indicator with $1 \le i \le n$ and $1 \le i \le m$. First, we differentiate between positive and negative indicators, depending on the improvement direction "more is better" or "less is better," respectively. An indicator is considered positive (I_{ij}^{+}) when a higher value represents an improvement in sustainability in the area. In contrast, an indicator is negative (I_{ik}^{-}) when a higher value represents decline in sustainability. In such that way, X_{ij}^{+} represents the value for the ith unit in the jth positive indicator, with $j \in J$, (J, positive indicators), and X_{ik}^{-} is the value of the ith unit in the kth negative indicator, with $k \in K$, (K, negative indicators group).

Then we determine the achievement levels or the target for each indicator, u_j^{+} for the positive and u_k^{-} for the negative. Later, we create the goals introducing the deviation variables to measure the difference between the indicator value and the target:

$$\textit{For positive}: I_{ij}^{+} + n_{ij}^{+} - p_{ij}^{+} = u_j^{+} \textit{ with } n_{ij}^{+}, p_{ij}^{+} \ge 0, n_{ij}^{+}.p_{ij}^{+} = 0, \tag{2}$$

$$\textit{For negative}: I_{ik}^{-} + n_{ik}^{-} - p_{ik}^{-} = u_k^{-} \textit{ with } n_{ik}^{-}, p_{ik}^{-} \ge 0, \;\; n_{ik}^{-}.p_{ik}^{-} = 0, \tag{3}$$

where n_{ij}^{+} is the undesirable variable for positive indicator and p_{ik}^{-} the undesirable variable for negative. Higher values of these variables reveal absence of sustainability. This procedure allows obtaining several indexes, and we choose the Net Goal Programming Synthetic Index $GPSI^{N}$, for its compensatory character among the strength and weaknesses for each unit under evaluation. This composite indicator evaluates the relative situation of each unit without demanding the execution of all the aspiration level to determine the sustainability

degree for a destination versus their competitors. The $GPSI^N$ for a unit is defined as follows:

$$GPSI_i^N = \sum_{j\in J} \frac{w_j^+ \left(p_{ij}^+ - n_{ij}^+\right)}{u_j^+} + \sum_{k\in K} \frac{w_k^- \left(n_{ik}^- - p_{ik}^-\right)}{u_k^-} \forall i \in \{1, 2, ..., n\}. \quad (4)$$

w_j^+ and w_k^- are the weights for positive y negative indicators respectively. The first adding exposes the difference between the strengths and weaknesses for positive indicators and similarly the second adding for the negative indicators.

The GPSI methodology has several advantages over other statistical methods. The first is that it requires no previous normalization method. Second, the methodology can be applied when the number of indicators is greater than the number of units of the initial system, making it useful in practice. Third, this new methodology builds the final synthetic indicator using all the indicators of the initial system, and thus there is no loss of information. The results are easy to interpret.

Moreover, this method allows including quantitative aspects and perceptions in the composite indicator through the determination of the weights, the establishment of the target values and the goals. Those aspects represent the stakeholder's desires with regard to the sustainability and the degree in which each destination achieves it.

4 | RESULTS AND DISCUSSION

The study took place during the measurement of the sustainability for the main Cuban nature-based tourism destinations (Table 2), especially due to the necessity to guarantee the quality of this modality as well as the interest of the Cuban Ministry of Tourism in its development to include Cuba as a consolidated destination in the CZST. Fifteen nature-based tourism destinations were identified, three of which are in the CZST: Viñales, Soroa, and Ciénaga de Zapata. They are priority areas for the development of nature-based tourism and cover 7774.97 km^2 of the Cuban area.

Except for San Diego de los Baños and Marea del Portillo, the other zones are located inside or constitute areas with some protection degree according to the National System of Protected Areas. They are locally managed and the population is the main tourist labor force. Local agriculture is aimed to support tourist activity and these places have developed and stimulated the local craft and customs. Also, local resources and heritage are their main attractiveness and houses serves as a lodging alternative. Compared with sun and beach tourism, these destinations receive a less number of tourist, mainly same-day visitors.

To calculate the synthetic indicators, firstly the positive and negative indicators were identified. After that, the achievement level for each one were selected, indicating the desired sustainability degree for each criterion. Thus, for the positive indicators $u_j^+ = 0.8 \cdot \overline{X}_{ij}^+$; this means, an achievement of the 80% of the mean for the positive indicators. While for the negative, the target value is the reciprocal: $u_k^- = \frac{1}{0.8} \cdot X_{ik}^-$. In this way, the results analysis becomes easier and useful allowing making an interactive analysis to increase the exigency of the achievement level for the positive indicators.

Results allow evaluating the relative situation of each destination without the necessity to accomplish all the achievement levels, performing a combined evaluation that allows the compensation between all the indicators. The analysis is based on the achievement or not of the target values for each of indicator, revealing the strengths and weaknesses of the destinations; as well as their weights, representative of the relative importance granted for the stakeholders to those aspects considered necessary to attain the sustainability. The analysis was performed by dimensions, and from a global point of view, taking as a reference the best and worst destinations in each ranking.

TABLE 2 Dimensional and overall ordinations with the unsustainability number (Unsust.)

	Dimensional Ordinations							
	Social		Economic		Patrimonial		Overall ranking	Unsust.
Zones	Ranking	Unsust.	Ranking	Unsust.	Ranking	Unsust.		
Guanahacabibes N. P.	**9**	1	**8**	1	**1**	0	**6**	2
Viñales N. P.	**6**	0	**11**	1	**9**	0	**9**	1
San Diego de los Baños	**13**	1	**5**	0	**15**	1	**13**	2
Soroa-Las Terrazas	**1**	0	**13**	3	**13**	1	**10**	4
Ciénaga de Zapata	**10**	2	**9**	1	**11**	0	**12**	3
Hanabanilla	**8**	0	**10**	1	**4**	0	**8**	1
Guajimico	**15**	2	**12**	1	**14**	1	**15**	4
Topes de Collantes	**12**	0	**1**	0	**7**	1	**4**	1
Alturas de Banao	**11**	0	**7**	0	**10**	0	**7**	1
Caguanes N. P.	**7**	0	**14**	1	**8**	0	**11**	1
Mayarí	**2**	0	**3**	0	**5**	0	**2**	0
Desembarco del Granma N. P.	**14**	1	**15**	1	**12**	1	**14**	3
Marea del Portillo	**5**	0	**2**	0	**3**	0	**1**	0
Baconao	**4**	1	**6**	0	**2**	0	**3**	0
Alejandro de Humboldt N. P.	**3**	0	**4**	0	**6**	0	**5**	0

4.1 | Social dimension

Results are shown in Table 2, where the position of each destination is indicated according to the value of the composite indicator and the number of "un-sustainability" (Unsust); this means, the quantity goals not achieved for each destination. The analysis are going to be made using results of index calculated for an achievement level of 80% of the mean for positive indicators.

The destination with a better social behavior is Soroa-Las Terrazas. It is where residents consider that public services have improved because of tourism (I_2). Additionally, in this zone, local population contemplate higher increment of life quality due to the tourism activity (I_5), understood as the achievement of direct income from tourism activity for local population as a result of the local products offering; the perceived safety for both, tourist and population, the improvement in highways and transportation infrastructure and public services, among others. These are the 7th and 2nd indicators according the importance level gave by stakeholders.

For this methodology, it is not enough only to satisfy the goals, but the amount they are overattained. We point out this because for this index with 80% of the mean for positive indicators, Soroa-Las Terrazas fulfill all the goals. However, Ciénaga de Zapata is in the 10th position and does not fulfill two goals while Alturas de Banao, Topes de Collantes, San Diego de los Baños, and Guajimico are in worst positions and have one or less unsustainability value. All of them, except Guajimico, only have one unsustainability value. This is because of the higher values of strengths, represented for those indicators for which Ciénaga de Zapata achieve the goals, in comparison with the weaknesses, indicated by those ones for which the destination does not complete the goal. Weaknesses of Ciénaga de Zapata in the first and fourth indicators are smaller than sixth and seventh respect to strengthens.

The permanence of Soroa-Las Terrazas in first position is due to it strengthens in the second indicator, with a difference of nearly 1 point (0.94) with the subsequent destination, while the higher variance among the remaining destinations for this indicator is less than 0.5.

In Figure 1, the variation of the positions is presented according to the increment of the achievement levels taking into consideration all the indicators. This gives importance to the methodology, because of the possibility to study the destinations' behavior while changing jointly the exigency level of all the aspects considered relevant for the stakeholders to attain the sustainability.

The graphic presents 11 cutoffs and each one shows the position of each destination according to the value of common factor; this is, varying the achievement level. In this case, a little variability can be noted in the rankings.

Soroa-Las Terrazas remains in the first position and Guajimico in the last one. The best improvement is for Guanahacabibes National Park, which progress three positions and finalize in 6th place. The worst change is for Mayarí, which begins in second place and ends in fifth. The remaining variations are related to one position.

As can be noted, results for this dimension constitutes indispensable arguments for the pacification of tourist development and the management process in general. This guarantees the participation of those involved in the destination management and the community acceptance of tourism throughout their perceptions of the social aspects for this activity.

4.2 | Economic dimension

In the economic dimension appears Topes de Collantes as the most sustainable destination. Among its strengths can be found the good perception of the tourists about the quality-price of lodging (IE_8) and the gastronomy (IE_9) in the destinations, 1st and 5th according to the importance level given by the stakeholders. It has also the second best evaluation of the quality for tourism employees and accessibility (IE_{10} and IE_{11}) which are the third and second in importance for this dimension, respectively. Guajimico is the worst destination for this dimension whit the lower score for the quality of tourist offer and a value over the mean only for the quality of access roads and events signalization (IE_{11}) which is the third in importance level.

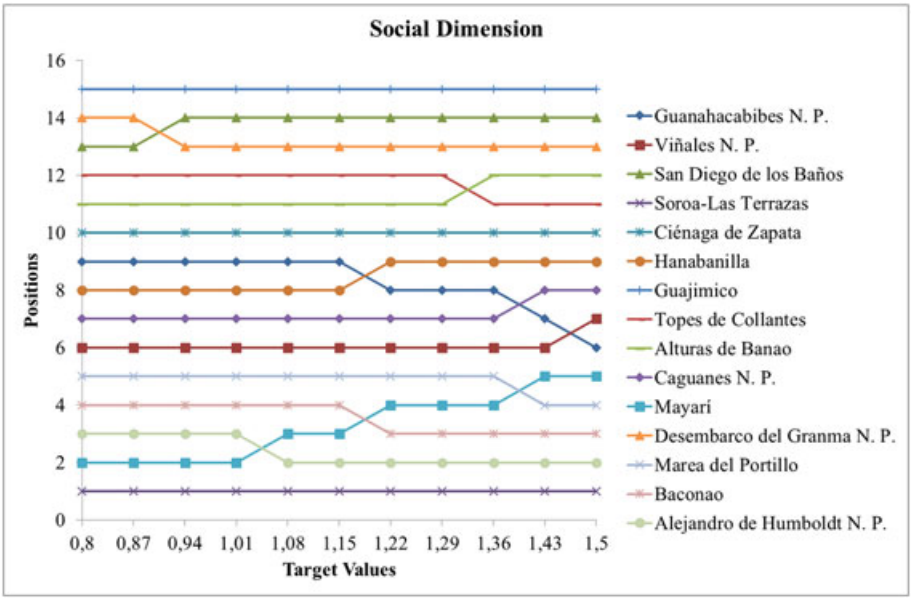

FIGURE 1 Stability for social dimension [Colour figure can be viewed at wileyonlinelibrary.com]

The economic behavior of destinations is analyzed depending on the enlargement of the achievement levels (Figure 2). As can be noted, all of them remains in the same position despite the extension of the target values. This is because of the similar valuation of economic aspects in all destinations, corroborated with the lower variability (0.2092). It is important to point out that despite the lower variability within results, the use of an aggregate measure was necessary because there is no possible to make this comparison merely observing the initial indicators' values. There is no destination better than the others according to indicators' scores.

Once more, results provide, relatively accurately, the main aspects to consider in the planning process of sustainable tourist activity regarding the economic dimension. The main weaknesses and strengths of each one of the units were identified towards ensuring a viable economic activity for the host community in a long term.

4.3 | Patrimonial Dimension

Considering the natural and cultural resources, Guanahacabibes National Park is the most sustainable. Its main strengths are the perceived cleanliness in the destination (IP_{13}) and the conservation of cultural resources and heritage (IP_{17}). These are the fifth and second indicator according to weights. It has scores over the mean, also for the offer of activities involved with the natural resources of the destination (IP_{14}) and the Perception of local population about whether the tourist stimulates local crafts and culture (IP_{16}). Moreover, the main weakness signaled by stakeholders was the negative effects of tourism in the environment and natural spaces (IP_{15}).

The worst position is occupied again by San Diego de los Baños, caused for the lower scores in two indicators (IP_{15} and IP_{16}) and values below the mean for the remaining indicators. Its main strength is the Tourists' evaluation about the conservation of cultural resources and heritage in the destination (IP_{17}).

Additionally, an analysis was performed to figure out if for some of the achievement values exists a similarity in the rankings form the three dimensions. In this case, it was possible to observe that for the value of $u_j^+ = 0.8 \cdot \overline{X}_{ij}^+$ is for which there is a greater similarity between the positions of the destinations because of the sustainability level achieved, while the highest differences is reported for $u_j^+ = 1.5 \cdot \overline{X}_{ij}^+$ (Figure 3).

The wide improvement variation shown by Topes de Collantes is due to extreme performances in some subindicators. This is the destination with the best qualification of the activities related to natural resources at the destination (IP_{14}), which is also the most important indicator for stakeholders. It also achieved the second better score in the tourists' evaluation about destination cleanliness (IP_{13}).

Viñales National Park is the destination with the highest negative variation (from position 9 to 13), caused mainly for its behavior in IP_{15}, where it is recognized as the worst destination, conjointly with IP_{13}, in which has occupied the fourth lowest score.

In this sense, the conservation of natural resources and local culture facilitates the development of the nature-based tourism. Thus, the analysis of this dimension remains important to identify the main issues to be considered by the planners with the aim to guarantee the sustainability from the patrimonial point of view, pursuing an efficient use of the environmental resources and granting respect to the socio-cultural authenticity of host communities.

4.4 | Overall performance

Marea del Portillo is the most sustainable destination, despite having obtained places from 2nd to 5th. Its main strength is the quality of access roads and events signalization (IE_{11}), with a point over the subsequent unit. This is the fourth in importance level of all the indicators considered indicator and is the only indicator in which this destination achieved the higher score in comparison with the other units. Additionally, it has a good behavior in the quality of tourist offer (IE_{12}), the ninth in importance.

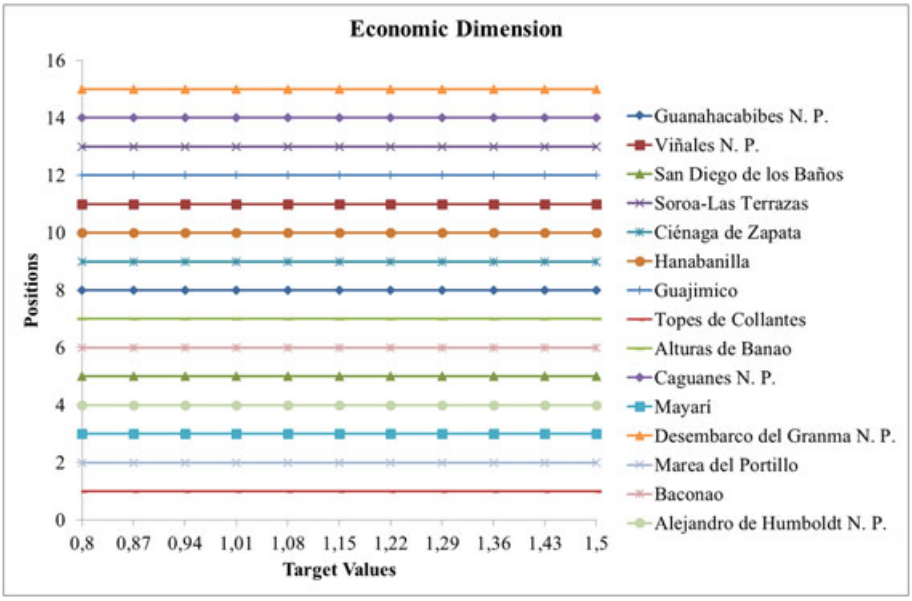

FIGURE 2 Stability for economic dimension [Colour figure can be viewed at wileyonlinelibrary.com]

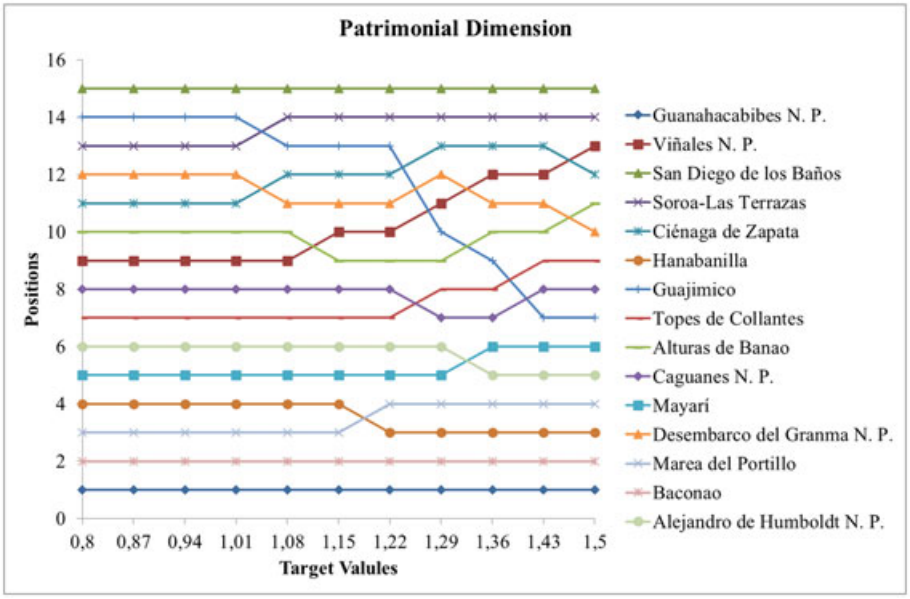

FIGURE 3 Stability for patrimonial dimension [Colour figure can be viewed at wileyonlinelibrary.com]

This destination has also, values over the mean for the remaining indicators except in the perception of the local population regarding whether improved roads and transport infrastructure is a result of tourism (IS_1), the quality—price of lodging (IE_8) and the perceived effects in the environment and impairments of natural spaces caused by tourists (IP_{15}). Those are the 15th, 3rd, and 11th according the importance level. This destination fulfill all the goals up to the third target value 0.94 and remains being the destination with less unsustainability up to the fourth target value 1.01. However, maintains the first position.

Figure 4 reveals high stability of the results for the global index, validating their robustness. Marea del Portillo remains in the first position, while San Diego, Desembarco del Granma N. P. and Guajimico occupied the last three positions for all the target values.

The higher improvement is for Alejandro de Humboldt N. P. (from 6^{th} to 3^{rd}), caused by its behavior in social issues, such as the improvement of roads and transport infrastructure caused by tourism (IS_1) were it has the higher valuation, and the consideration of the increment of the life quality in the destination because of tourism (IS_5). In addition, the quality of access roads (IE_{11}) and the good perception of the activities involved with natural resources (IP_{14}) contribute to the improvement for this destination. Mayarí is the destination that worsens, moving from 2nd to 4th position, mainly by the score obtained with regard to the perception of local population about the increment of life quality due the tourism.

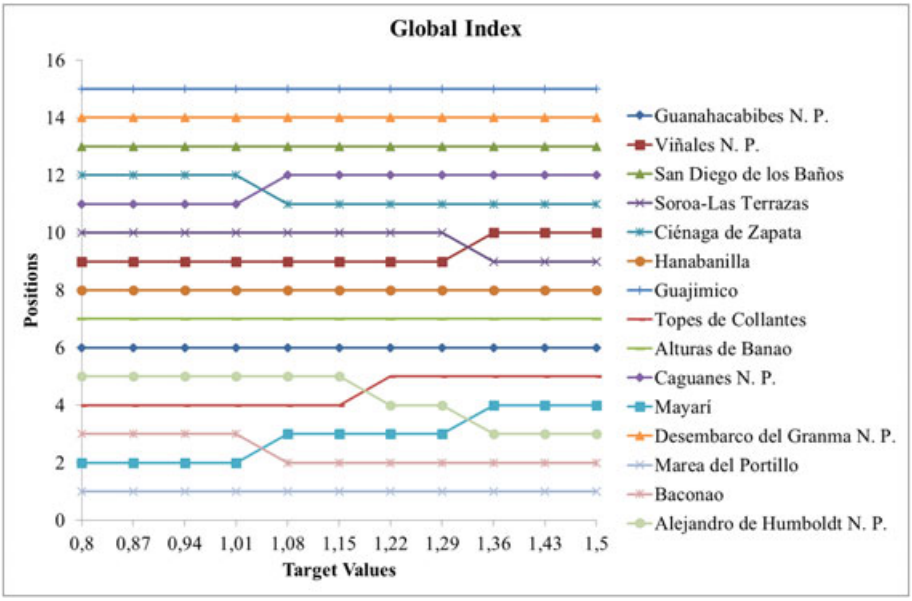

FIGURE 4 Stability for the global index [Colour figure can be viewed at wileyonlinelibrary.com]

5 | CONCLUSIONS

This study constitutes an example of how it is possible to insert the stakeholders' perceptions in the measurement process of touristic sustainability. First, during the determination of initial indicators to analyze this concept, the research was developed on the basis of a participative process, from previous studies, and the joint participation of researchers, local residents, and representatives from enterprises involved in tourism development in the community.

In this way, the selected indicators measure what is considered important for the stakeholders. These indicators were easily accessible to the decision-makers, diverse to meet the requirements of different users and developed by the end-users. All the information belongs to subjective indicators, which are representative of the perceptions that plays an important role in the sustainability analysis.

The application of the Delphi method allows us to attain the proposed objective, because experts were capable to get the weights that truly represent the importance level of each indicator. In our case, to guarantee a high consensus degree, it was necessary to apply two rounds. Results reveal that the greater importance was conceded to the economic dimension and lastly the patrimonial.

In the same order, the aggregation procedure, developed from the Multiple Criteria Decision Theory, allows the participation of the decision makers in the calculation process. The goals were fixed with flexibility and guaranteed the performance of an interactive analysis of rankings starting from the achievement values and, consequently, more robustness in the conclusions was gained.

In this sense, this study allows us to get a set of indicators, representative of the interests of those involved in the development of tourist sector, verified as reliable to measurements of the sustainability and quantified according to the available information; besides, we obtained the weights, representative of the importance granted for each indicator.

Finally, we get the scores of the synthetic index for each destination and their ranking. Results show a perspective of what is needed from the social, economic, and patrimonial point of view to improve the sustainability of destinations with the worst performance and to maintain or increase the sustainability of destinations with the best positions, according to the number of unsustainability; this is, the amount of indicators for which a destination does not achieve the desirable goals.

A limitation of this study was the absence of tourists in the choice of initial indicators, to find out what do they consider important for been a destination sustainable. In this sense, future research should take it into account. Additionally, a different study could be developed considering objective indicators and creating the goals an exact and real target values.

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